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TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application No.	09/275,273
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		First Named Inventor	Frank P. Hart
		Group Art Unit	2181
		Examiner Name	Paul R. Myers
Total Number of Pages in This Submission		Attorney Docket Number	42390P5368

ENCLOSURES (check all that apply)		
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Signature	<i>Lisa Tom</i>
Date	September 19, 2002

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Complete if Known

Application Number 09/275,273
Filing Date March 23, 1999
First Named Inventor Frank P. Hart
Examiner Name Paul R. Myers
Group/Art Unit 2181
Attorney Docket No. 42390P5368

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT (\$) 320.00

METHOD OF PAYMENT (check one)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☐ Deposit Account

Deposit Account Number 02-2666

Deposit Account Name Blakely, Sokoloff, Taylor & Zafman LLP

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
101	740	201	370	Utility filing fee	
106	330	206	165	Design filing fee	
107	510	207	255	Plant filing fee	
108	740	208	370	Reissue filing fee	
114	160	214	80	Provisional filing fee	
SUBTOTAL (1)					

2. EXTRA CLAIM FEES

Total Claims 18 - 20* = 0 X 18.00 = \$0.00
Independent Claims 4 - 4* = 0 X 84.00 = \$0.00
Multiple Dependent

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
103	18	203	9	Claims in excess of 20	
102	84	202	42	Independent claims in excess of 3	
104	280	204	140	Multiple Dependent claim, if not paid	
109	84	209	42	**Reissue independent claims over original patent	
110	18	210	9	**Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)					0.00

*or number previously paid, if greater, For Reissues, see below

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for ex parte reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	920	217	460	Extension for reply within third month	
118	1,440	218	720	Extension for reply within fourth month	
128	1,960	228	980	Extension for reply within fifth month	
119	320	219	160	Notice of Appeal	
120	320	220	160	Filing a brief in support of an appeal	320.00
121	280	221	140	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,280	241	640	Petition to revive - unintentional	
142	1,280	242	640	Utility issue fee (or reissue)	
143	460	243	230	Design issue fee	
144	620	244	310	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Processing fee under 37 CFR 1.17(q)	
126	180	126	180	Submission of Information Disclosure Statement	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	740	246	370	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	740	249	370	For each additional invention to be examined (37 CFR § 1.129(b))	
179	740	279	370	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	
Other fee (specify)					
*Reduced by Basic Filing Fee Paid					
SUBTOTAL (3)					320.00

SUBMITTED BY

Complete (if applicable)

Name (Print/Type) Lisa Tom Registration No. 52, 291 Telephone (503) 684-6200
Signature [Signature] Date 09/19/02

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Attorney's Docket No.: 042390.P5368

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Hart et al.

Application No.: 09/275,273

Filed: 3/23/99

For: **MULTIPLE VOLTAGE
REGULATORS FOR USE WITH A
SINGLE LOAD**

Examiner: P. Myers

Art Group: 2181

Assistant Commissioner for Patents
Washington, D.C. 20231

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BOARD OF PATENT APPEALS
AND INTERFERENCES

APPEAL BRIEF
IN SUPPORT OF APPELLANTS' APPEAL
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Sir:

The Appellants hereby submit this Brief in triplicate in support of their appeal from a final decision of the Examiner, mailed April 30, 2002, in the above-captioned case. The Appellants respectfully request consideration of this appeal by the Board of Patent Appeals and Interferences for allowance of the above-captioned patent application.

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I. REAL PARTY IN INTEREST

The real party in interest in the above-identified application is Intel Corporation, a Delaware corporation having a principal place of business at 2200 Mission College Boulevard, Santa Clara, California 95052, which is owner of all right, title, and interest in the above-identified patent application by an Assignment recorded at Reel 9919, Frame 0879.

II. RELATED APPEALS AND INTERFERENCES

The Appellants' undersigned attorney and the assignee identified above do not know of any other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the subject pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-18 are pending and currently stand rejected by the Examiner under the final Office Action dated April 30, 2001. Claims 1-7 and 10-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,766,364 issued to Biamonte et al. in view of U.S. Patent No. 6,268,716 issued to Burstein et al. Claims 8-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Biamonte et al. in view of Burstein et al. and further in view of U.S. Patent No. 6,191,943 issued to Tracy. In a Notice of Appeal dated July 23, 2002, Appellants appealed from the final decision of the Examiner. The final rejection of claims 1-18 therefore stand appealed.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final Office Action of April 30, 2002.

V. SUMMARY OF THE INVENTION

The invention relates to a method and apparatus for multiple voltage regulators for use with a single load. The invention allows power to be supplied to an electrical load using multiple voltage regulators based on the operating environment of the load. A primary voltage regulator is coupled to the load and to a power supply to provide a first amount of power. The primary voltage regulator detects power supplied to the load and controls one or more additional voltage regulators. A secondary voltage regulator is coupled to the load, the power supply, and the primary voltage regulator. The secondary voltage regulator provides a second amount of power and provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

In one embodiment of the invention, the primary voltage regulator is built of relatively low capacity and relatively high efficiency components to supply power from a limited power source. In one embodiment of the invention, the secondary voltage regulator is built of higher capacity and possibly lower efficiency components when power is from a less limited source. In one embodiment, a tertiary voltage regulator is used that is built of possibly higher capacity and lower efficiency components to provide even more power.

VI. ISSUES PRESENTED FOR REVIEW

The issues presented for review are:

(A) Whether claims 1-7 and 10-18 were improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,766,364 issued to Biamonte et al. in view of U.S. Patent No. 6,268,716 issued to Burstein et al.;

(B) Whether claims 8-9 were improperly rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,766,364 issued to Biamonte et al. in view of U.S. Patent No. 6,268,716 issued to Burstein et al. and further in view of U.S. Patent No. 6,191,943 issued to Tracy.

VII. GROUPING OF CLAIMS

For the purposes of this appeal, claims 1-18 stand or fall together.

VIII. ARGUMENT

A. Prior Art Cited by the Examiner

1. U.S. Patent No. 4,766,364 issued to Biamonte (herein the '364 patent)

The '364 patent is directed to a power supply system with a master voltage regulator and a plurality of slave voltage regulators. To achieve current balance among the regulators, the master regulator compares the output voltage to a reference to develop an error signal, which is transmitted to all slave regulators. (See col. 1, lines 53-57). Since the error voltage controls the output from each regulator, currents will be substantially balanced among all regulators. (See col. 1, lines 58-60). Each slave regulator has its own error amplifier circuitry to allow the slave regulator to control its own inductor current if the master error signal is outside of predefined limits. (See col. 3, lines 21-25).

2. U.S. Patent No. 6,268,716 issued to Burstein et al. (herein the '716 patent)

The '716 patent is directed to a digital voltage regulator using current control. The master controller uses a digital current-based control algorithm and ensures that the current flowing out of the switching regulator matches the current flowing into the load, thereby maintaining the output voltage at a substantially constant level. (See col. 4, lines 62 to 63 and col. 5, lines 3 to 6).

3. U.S. Patent No. 6,191,943 issued to Tracy (herein the '943 patent)

The '943 patent is directed to a docking station with a thermoelectric heat dissipation system for a docked portable computer. The thermoelectric cooling system is operative to dissipate operating heat from the docked portable computer and has a cold side portion positioned to be engaged and receive heat from a heat dissipation portion of the portable computer, which is thermally communicated with an internal heat-generating component within the computer, in response to movement of the portable computer through the docking path. (See col. 2, lines 20-27).

B. The Examiner's Analysis and Rejections

In the final Office Action dated April 30, 2002, claims 1-7 and 10-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '364 patent in view of the '716 patent. Claims 8-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '364 patent in view of the '716 patent and further in view of the '943 patent.

In the final rejection, the Examiner stated that the '364 patent teaches most of the limitations of claims 1, 11, and 15, except that the '364 patent does not teach the limitation of a

second voltage regulator sending a signal to a primary voltage regulator indicating whether the second voltage regulator is enabled. The Examiner stated that the '716 patent teaches returning status information including how much current the regulator can supply. The Examiner then stated that it would have been obvious to a person of ordinary skill in the art to return local status information to the master controlling regulator because it would have provided greater control. The Examiner further acknowledged that the '716 patent does not expressly teach returning status information that includes whether the regulator is enabled. However, the Examiner took Official Notice that whether a device is enabled is an important bit of status information. Therefore, the Examiner concluded that it would have been obvious to include whether the device is enabled because this would have provided greater control and accuracy in current regulation.

In a June 21, 2002 Response (submitted as a response after final rejection under 37 C.F.R. §1.116), Appellants again argued that the limitations of the claims had not been met by the cited references. Specifically, Appellants opined that neither the '364 patent nor the '716 patent nor the '943 patent teaches a second voltage regulator sending a signal to a primary voltage regulator indicating whether the second voltage regulator is enabled. Appellants traversed Examiner's taking Official Notice that whether a device is enabled is an important bit of status information and Examiner's conclusion that returning a signal indicating whether the second voltage regulator was enabled was obvious from the teachings of the '716 patent. Appellants opined that the importance of returning a type of signal depends on the type of system involved. The '716 patent discloses a digital voltage regulator using current control. Therefore, it is important for the system in the '716 patent to regulate current and return a signal indicating the current passing through the switching circuit. However, the '716 patent does not teach a second voltage regulator sending a signal to a primary voltage regulator indicating whether the

second voltage regulator is enabled. None of the cited references disclose a second voltage regulator sending a signal to a primary voltage regulator indicating whether the second voltage regulator is enabled. This limitation is expressly recited in claims 1-18.

In a July 9, 2002 Advisory Action, Appellants' arguments were dismissed as failing to overcome the §103 rejections.

C. Appellants' Response to the Examiner's Rejections

1. Claims 1-18 each recite the limitation of a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the second voltage regulator is enabled.

Claims 1-4 are directed to a circuit arrangement comprising a primary voltage regulator coupled to an electrical load and to a power supply to provide a first amount of power and a secondary voltage regulator coupled to the electrical load, to the power supply, and to the primary voltage regulator, to provide a second amount of power. The primary voltage regulator detects power supplied to the electrical load and controls one or more additional voltage regulators. The secondary voltage regulator provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

Claims 5-10 are directed to a computer system comprising a processor module having a processor and a primary voltage regulator coupled to supply a first amount of power to the processor and a system board, coupled to the processor module, having a secondary voltage regulator coupled to supply a second amount of power to the processor. The primary voltage regulator detects power supplied to the processor by at least one additional voltage regulator and controls at least one additional voltage regulator. The secondary voltage regulator coupled to and

controlled by the primary voltage regulator provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

Claims 11-14 are directed to a method for supplying power comprising supplying power via a primary voltage regulator to an electrical load, detecting whether a secondary voltage regulator is coupled to supply power to the electrical load, and supplying power to the electrical load with the secondary voltage regulator if the secondary voltage regulator is present. The second voltage regulator is controlled by the primary voltage regulator and provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

Claims 15-18 are directed to an apparatus for supplying power comprising means for supplying power via a primary voltage regulator to an electrical load, means for detecting whether a secondary voltage regulator is coupled to supply power to the electrical load, and means for supplying power to the electrical load with the secondary voltage regulator if the secondary voltage regulator is present. The second voltage regulator is controlled by the primary voltage regulator and provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

Thus, claims 1-18 each recite the limitation of a secondary voltage regulator coupled to a primary voltage regulator, where the secondary voltage regulator provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

2. Neither the '364 patent nor the '716 patent nor the '943 patent discloses a secondary voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

As is clearly set forth at Section 706.02(j) of the M.P.E.P., the following three basic criteria must be met in order for the Examiner to establish a prima facie case of obviousness:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
2. There must be a reasonable expectation that combining the references would successfully result in the claimed invention; and
3. The prior art references when combined must teach or suggest all limitations of the claims under examination.

The '364 patent discloses a power supply system with a master voltage regulator and a plurality of slave voltage regulators. The master regulator generates a control signal to control the output of the slave regulators to provide balanced load sharing. (See col. 1, lines 53-60). Each slave regulator has its own error amplifier circuitry to allow the slave regulator to control its own inductor current if the master control signal is outside of predefined limits. (See col. 3, lines 21-25). As stated in the Office Action, the '364 patent does not disclose, teach, or suggest a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

The '943 patent discloses a docking station with a thermoelectric heat dissipation system for a docked portable computer. The '943 patent does not disclose, teach, or suggest a second

voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

The '716 patent discloses a digital voltage regulator using current control. The Office Action states that the '716 patent does not teach a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled. The '716 patent teaches a feedback signal generated to represent the current passing through the switching circuit. (See col. 2, lines 16-18). The Office Action generalizes this feedback signal to state that the '716 patent teaches returning status information, and Official Notice was taken that whether a device is enabled is an important bit of status information. Appellants traverse.

The importance of returning a type of signal depends on the type of system involved. The '716 patent's system regulates voltage using current control. The master controller uses a digital current-based control algorithm and ensures that the current flowing out of the switching regulator matches the current flowing into the load, thereby maintaining the output voltage at a substantially constant level. (See col. 4, lines 62 to 63 and col. 5, lines 3 to 6). Therefore, the '716 patent's system generates a feedback signal representing the current passing through the switching circuit. (See col. 2, lines 16-18). The '716 patent does not disclose, teach, or suggest a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

Neither the '364 patent, nor the '943 patent, nor the '716 patent discloses a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled. This feature is expressly recited in claims 1, 5, 11, and 15. Therefore, whether taken individually or in combination, the '364 patent, the '943 patent, and the '716 patent do not disclose, teach, or suggest the invention as claimed in claims 1, 5, 11, and 15.

Claims 2-4, 6-10, 12-14 and 16-18 are dependent claims and distinguish for at least the same reasons as their independent base claims in addition to adding further limitations of their own. Therefore, Appellants submit that claims 1-18 are not rendered obvious by the '364 patent, the '943 patent, and the '716 patent.

3. There is no suggestion to modify or combine the references in the manner stated in the Office Action.

As stated in Section 706.02(j) of the M.P.E.P., the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. Also see In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The '364 patent is directed to parallel power systems. The '716 patent is directed to a digital voltage regulator using current control. The '943 patent is directed to a docking station with a thermoelectric heat dissipation system for docked portable computers. There is no suggestion in these references to modify or combine the references to produce a system with a primary voltage regulator coupled to a secondary voltage regulator, where the secondary voltage regulator provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

As indicated in the Office Action, neither the '364 patent, nor the '943 patent, nor the '716 patent discloses a second voltage regulator providing a signal to a primary voltage regulator to indicate whether the secondary voltage regulator is enabled. The Office Action attempts to modify the '716 patent's teachings of a digital current-controlled voltage regulator that provides a feedback signal generated to represent the current passing through the switching circuit to a system with a secondary voltage regulator providing a signal to the primary voltage regulator to

indicate whether the secondary voltage regulator is enabled. In order to justify this modification, the Office Action generalizes the '716 patent's feedback signal representing current to a signal returning status information. Then, Official Notice was taken that whether a device is enabled is an important bit of status information. In addition to all these steps, the Office Action goes on to combine this modification of the '716 patent's digital current-controlled voltage regulator with the '364 patent's teachings of a power supply system that includes a plurality of voltage regulating power supplies. By going through all the above steps, the Office Action finally arrives at the present invention, which includes a primary voltage regulator coupled to a secondary voltage regulator, where the secondary voltage regulator provides a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled. This is improper use of hindsight. The teaching or suggestion to make the claimed combination stated in the Office Action is not found in the prior art references. Therefore, Appellants submit that claims 1-18 are not rendered obvious by the '364 patent, the '943 patent, and the '716 patent.


D. Conclusion

For all of the above-stated reasons, Appellants submit that the pending claims are in condition for allowance. Accordingly, Appellants respectfully request that the Board reverse the Examiner's Section 103 rejections and return the application to the Examiner with instructions to promptly allow all pending claims.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Date: 9/19/02



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IX. APPENDIX A – CLAIMS ON APPEAL

The claims on appeal read as follows:

1. (Twice Amended) A circuit comprising:
a primary voltage regulator coupled to an electrical load and to a power supply to provide a first amount of power, the primary voltage regulator to detect power supplied to the electrical load and to control one or more additional voltage regulators; and

a secondary voltage regulator coupled to the electrical load, to the power supply, and to the primary voltage regulator, the secondary voltage regulator to provide a second amount of power, the secondary voltage regulator to provide a signal to the primary voltage regulator to indicate whether secondary voltage regulator is enabled.
2. (Amended) The circuit of claim 1, wherein the secondary voltage regulator further comprises circuitry to control one or more additional voltage regulators.
3. (Amended) The circuit of claim 2, further comprising a tertiary voltage regulator coupled to the power supply, to the electrical load, and to the secondary voltage regulator, the tertiary voltage regulator to supply a third amount of power.
4. (Amended) The circuit of claim 1, further comprising a tertiary voltage regulator coupled to the power supply, to the electrical load, and to the primary voltage regulator, the tertiary voltage regulator to supply a third amount of power.
5. (Amended) A system comprising:
a processor module having a processor and a primary voltage regulator coupled to supply a first amount of power to the processor, the primary voltage regulator also to detect power supplied to the processor by at least one additional voltage regulator and for controlling at least one additional voltage regulator; and

a system board coupled to the processor module having a secondary voltage regulator coupled to supply a second amount of power to the processor, the secondary voltage regulator

coupled to and controlled by the primary voltage regulator, the secondary voltage regulator to provide a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

6. (Amended) The system of claim 5, further comprising a signal communicated from the secondary voltage regulator to the primary voltage regulator to indicate when the secondary voltage regulator is supplying power.

7. (Amended) The system of claim 5, further comprising a docking station configured to receive a mobile computer, the docking station having a tertiary voltage regulator coupled to supply a third amount of power when the docking station has received the mobile computer, the voltage regulator coupled to and controlled by the primary voltage regulator.

8. (Amended) The system of claim 7, wherein the docking station further comprises an active thermal dissipation device thermally coupled to the tertiary voltage regulator.

9. (Amended) The system of claim 8, further comprising a signal from the tertiary voltage regulator to the primary voltage regulator to indicate when the tertiary voltage regulator is supplying power.

10. (Amended) The system of claim 5, wherein the secondary voltage regulator is enabled in a pulse width modulated manner.

11. (Twice Amended) A method for supplying power comprising:
supplying power via a primary voltage regulator to an electrical load;
detecting whether a secondary voltage regulator is coupled to supply power to the electrical load; and

supplying power to the electrical load with the secondary voltage regulator, if present, the second voltage regulator controlled by the primary voltage regulator, the second voltage regulator providing a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

12. The method of claim 11, wherein the secondary voltage regulator is enabled by the feedback circuit in a pulse width modulated manner.

13. The method of claim 11, further comprising:
detecting whether a tertiary voltage regulator is coupled to supply power to the electrical load; and
supplying power to the electrical load with the tertiary voltage regulator, if present and if necessary, the tertiary voltage regulator controlled by the feedback circuit.

14. The method of claim 13, wherein the tertiary voltage regulator is enabled by the feedback circuit in a pulse width modulated manner.

15. (Twice Amended) An apparatus for supplying power comprising:
means for supplying power via a primary voltage regulator to an electrical load;
means for detecting whether a secondary voltage regulator is coupled to supply power to the electrical load; and
means for supplying power to the electrical load with the secondary voltage regulator, if present, the second voltage regulator controlled by the primary voltage regulator, the second voltage regulator providing a signal to the primary voltage regulator to indicate whether the secondary voltage regulator is enabled.

16. The apparatus of claim 15, wherein the secondary voltage regulator is enabled by the feedback circuit in a pulse width modulated manner.

17. The apparatus of claim 15, further comprising:
means for detecting whether a tertiary voltage regulator is coupled to supply power to the electrical load; and
means for supplying power to the processor with the tertiary voltage regulator, if present and if necessary, the tertiary voltage regulator controlled by the feedback circuit.

~~18.~~ The apparatus of claim 17, wherein the tertiary voltage regulator is enabled by the feedback circuit in a pulse width modulated manner.